

Advanced Distillation Curve Measurement: Applications to Gasolines, Rocket Propellant and Jet Fuels

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In a previous talk, a number of improvements in the method and apparatus used for the measurement of distillation curves for complex hydrocarbon fluid mixtures were presented. These improvements included the addition of a composition-explicit channel of data, improved temperature control and measurement, and improved and less uncertain volume measurement. In this talk, we demonstrate the improved approach with application to several complex hydrocarbon fluids, Rocket Propellant 1 (RP-1), JP-8, a synthetic JP-8 that is designated as S-8, and several gasoline mixtures. RP-1 is a long-established hydrocarbon fuel that continues to be widely used since it was first developed in the 1950's. Modern versions of this fluid are produced from a narrow-range kerosene fraction that is processed to reduce unsaturated compounds and also sulfur-containing hydrocarbons. S-8 is a synthetic substitute for fluids such as JP-8 and Jet-A. It is produced with the Fischer Tropsch process from natural gas. As these new and reformulated fluids gain increasing application, especially in aviation/aerospace application, it will be increasingly important to have material characterization test procedures that are reproducible, and that have a sound and fundamental basis. This will allow modeling of the properties, and guide further refinement of the fluids.